



STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

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**Recycling and Solid Waste Management Report
Fiscal Year 1999**

This report is a summary of the recycling and solid waste management efforts within the North Carolina Department of Transportation for fiscal year 1999 (July 1, 1998 - June 30, 1999) as required by G.S. 136-28.8(g) which mandates the Department to prepare an annual report on the amounts and types of recycled materials that were specified or used in contracts during the previous fiscal year. The types of recycled materials incorporated into the projects noted would normally contribute to the consumer and industrial waste streams, conducing the problems of declining space in landfills.

Efforts to utilize recycled and solid waste materials are in response to the requirements of Senate Bills 111 and 58, ratified in 1989 and 1993, respectively, by the General Assembly of North Carolina. Senate Bill 111 mandates the Department to research and incorporate recycled/recyclable materials into highway construction projects, specifically ground waste rubber tires and recycled mixed plastic materials. Senate Bill 58 requires the use of recycled materials for guardrail posts, right of way fence posts, and sign supports where economically practical and when engineering standards are met.

Highway Construction Projects

- A. Three roadway projects utilizing recycled materials were awarded to contract during the 1999 fiscal year. Approximately 918,179 tires were specified for use in embankment fills.
- B. Four contracts along the US 15-501 Corridor in Orange and Chatham Counties were selected to require clearing and grubbing debris from the project to be mulched and reused. This was done in response to legislative issues preventing C&G debris from being landfilled or burned. The first project was let to contract on January 19, 1999. The remaining contracts are scheduled to be let August, 2000; October, 2000 and October 2002.
- C. The NCDOT operates and maintains over 7000 traffic signals on the State highway system. The annual cost of electrical energy required to operate these systems is over \$4 million. Within the last five years, industries have begun to apply simple, cost-effective LED (light emitting diode) devices to items such as vehicle brake lights and traffic signals. Red LED's have been the first employed in the traffic signal heads because existing LED technology could provide the proper color and light intensity to meet existing specifications for traffic signals lighted by incandescent lamps. From

November 1996 to April 1997, the Traffic Engineering and Safety Systems Branch evaluated four intersections equipped with red ball LED indications for energy savings and associated cost savings. The evaluation clearly showed energy savings and anticipated cost savings. The Traffic Engineering and Safety Systems Branch began specifying red ball LED indications on new projects as of July 1, 1998. Another engineering change evaluated during the same period involved replacing a double red ball indication on the protected left turns with a single LED red arrow indication. This change which became effective January 1, 1998 resulted in an energy savings of 285 watt/hours for each signal head. There is one manufacturer who can produce a green ball LED indication; however, the present cost of green indications makes its implementation cost-prohibitive. Currently, there is not a company manufacturing a yellow indication that meets the intensity requirements of the ITE specifications.

- D. Division 10 utilized 224.0 tons of steel slag and 203.49 tons of crushed glass in lieu of ABC stone to stabilize a portion of the maintenance yard and to provide backfill and drainage around three sides of a new storage building. The crushed glass was provided by the Mecklenburg County Recycling Center at no cost. The recycled glass came from the curbside to the recycling center. It was then crushed to a graduation of fine and course material. The recycled glass was used for the surface and drainage course over the steel slag in the storage area where concrete pipe is stored. The steel slag was purchased at a cost of \$4.50 per ton compared to \$7.65 per ton of ABC aggregate. Utilizing recycled materials in lieu of ABC stone created a total savings of \$2,261.53 for the project.
- E. A summary of the items used or specified for use during the 1999 Fiscal Year is included in Attachment #1. A summary of quantities used since 1989 is included in Attachment #2.

OTHER EFFORTS

Environmental Sustainability

In September of 1998, Governor Hunt held a Summit on Sustainability and Smart Growth in which Cabinet Officers, Agency Heads, Chancellors and Presidents from across state government outlined initial ideas on how state government could become a model of environmental stewardship and sustainability. In February of 1999, a Forum of the designated State Agency Sustainability Officers met to discuss the next steps in the process with the publication of the Environmental Sustainability Plans for many of the North Carolina State agencies. These plans included what is currently being done for environmental sustainability and plans for the future. The NCDOT's current projects include a highway construction recycling pilot project and Operation Clean Sweep. Future projects include a "green" rest area and the NCDOT's alternative fuel vehicle program. In July, 1999 a Tech Fair was held on the Dorothea Dix Campus in which state agencies displayed their various environmental sustainability efforts. At this event, Governor Hunt signed legislation aimed at cleaner air and water, reduction in vehicle emissions and executive orders including expanded procurement of environmentally preferable products. A list of the DOT's sustainability projects with more detailed information is included in Attachment #3.

Continuous Process Improvement

A Environmental Sustainability category was added to the Continuous Process Improvement Program to recognize the most innovative and effective initiative that sustains the environment through changes to an existing process or implementation of a new process.

Solar Technology

In February, 1999 a Departmental Solar Working Group was formed to find applications within the Department for which solar would be the most cost effective and reliable technology to use, and to facilitate deployment of solar into these applications. These efforts are through a partnership with the North Carolina Solar Center of North Carolina State University. A survey was conducted to identify transportation projects that utilize solar technology and develop a 10-year solar action plan.

Habitat for Humanity

The DOT has established a relationship with the Wake County Habitat for Humanity to donate houses located on DOT right-of-ways scheduled to be torn down. Habitat for Humanity can deconstruct the houses and sell the building materials at a minimal charge to people who otherwise could not afford to purchase these materials. This re-uses valuable building materials and thus prevents the demolition debris from being taken to the landfill. During this fiscal year, three houses in Holly Springs were selected for partial deconstruction by the Habitat for Humanity.

Reclaimed Timber

A covered bridge was constructed in Old Salem to serve as a walkway across Old Salem Boulevard. The bridge was constructed from reclaimed timbers from a demolished early 20th century fertilizer plant in Virginia, others came from the early 20th century Champion paper mill in Canton, NC. The oldest timbers were pulled up from Savannah Harbor, Georgia where they had been used as pilings for over 200 years.

Aluminum Sign Recycling

The Department of Transportation in conjunction with the Department of Corrections is moving forward with establishing an efficient, environmentally friendly, state-of-the-art Aluminum Highway Sign Reclaiming Operation. The Aluminum Sign Reclaiming Operation involves utilizing a high-pressure water system to remove the old sign face material leaving a cleaned surface for applying a new sign face. The “new” sign is ready to be reused on our highway system. The key benefit to the process is that the aluminum is not affected during the cleaning eliminating the need to reapply the environmentally unfriendly chromate conversion coating. The chromate conversion coating is necessary to retard corrosion. Additionally, the high-pressure water system does not reduce the thickness of the aluminum making it possible for the aluminum to be used over and over. Aluminum sign recycling offers great savings to the citizens of North Carolina and is

simply the environmentally correct thing to do. Our aluminum signs are 100% recyclable. The plant will be located in Carthage, North Carolina.

Awards/Recognition

The NCDOT was recognized for its significant achievement in the state government category of the 1997 Governor's Award for Excellence in Waste Reduction in October, 1998. This achievement was made possible through the office of Administration by changing office practices that reduced the amount of supplies needed for daily work. The Division of Motor Vehicles automated all drivers license offices reducing 75 percent of its waste paper. The Ferry Division recycles recovered bilge oil, used engine oil, brass, copper, steel and other metals from operations at the shipyard. The Rail Division provides on-board recycling facilities for its passengers and recycles lead acid batteries, oil filters, and used oil during maintenance work. Repair and reuse activities are incorporated into the Division of Highway's design, construction and maintenance of 77,000 miles of roads and over 17,000 bridges in the state. The DOT motor fleet re-uses antifreeze recycles lead-acid batteries and motor oil and vehicle tires are re-treaded. Recycling facilities are located at all rest areas and welcome centers. The DOT and Department of Corrections created a training program for inmates to repair electrical, pneumatic, and hydraulic tools.